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MARINE SCIENCES IN PAKISTAN

By JOHN D. COSTLOW, Jr.

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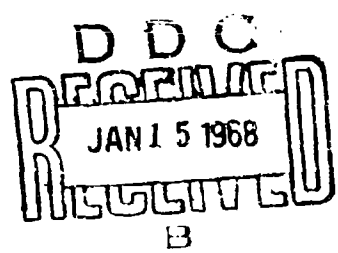

UNITED STATES OF AMERICA

MARINE SCIENCES IN PAKISTAN

Three institutions in West Pakistan are involved in research in the marine environment. Two of these, the University of Karachi and the Zoological Survey Department, have among their staff members those whose personal research interests and teaching are directed toward various aspects of marine biology. The third, the Marine Fisheries Department, is devoted exclusively to marine studies. A three-day visit is obviously insufficient time to consider in any great detail the facilities, individual research programs, and general trends for an entire country. This period did, however, serve as an introduction to the marine sciences in West Pakistan and provided a glimpse of several current areas of interest.

University of Karachi, Department of Zoology

Four members of the staff of this Department have been involved in research on marine animals. Dr. S.M. Haq is attempting to continue his studies on respiration, filtration, and food ingestion and assimilation in copepods, although most of the experimental work has of necessity been done outside of Pakistan. Haq, who worked with Prof. Knight-Jones at Swansea and received the PhD from the University College Wales, has worked at Woods Hole, and the paper which he presented at the 2nd International Congress of Oceanography in Moscow 1966 involved studies on two species of Metridia from the Gulf of Maine. Although he would like to continue studies on the distribution of copepods in Pakistan waters, ship facilities are very limited and quite unpredictable. According to him, the MACHERA, one of the fisheries research vessels of the Marine Fisheries Department, has only been made available to him for three cruises in five years. Results of these cruises have been worked up, but it is apparent that a number of additional, regularly scheduled cruises will be necessary to provide a complete picture of distribution, seasonal variations, upwelling, and the way in which current patterns during various portions of the year affect the general distribution of plankton in the Arabian Sea. He had hoped to complement his own collections with material from the International Indian Ocean Expedition, but from a statement made publicly at the Oceanographic Congress, as well as later private remarks, it would appear that he has had difficulties in obtaining material from the Biological Sorting Center in Cochin. Haq is presently active in developing plans for a National Institute of Oceanography in Pakistan and, at the time of my visit, was patiently awaiting consideration of a general program in oceanography by the newly formed National Committee of Oceanography of the Agricultural Research Committee.

Dr. Nasima M. Tirmizi, the only woman on the staff, has been working on the taxonomy of adult marine crustaceans with particular reference to the shrimps. She had just returned from the 19th Pakistan Science

Conference where she had presented a paper on the taxonomy of a coastal Anomuran belonging to the genus Callianassa. Tirmizi has published rather more widely than some of her associates, perhaps because her work is less dependent upon modern, specialized equipment, and is hoping to visit the Smithsonian during 1967 or 1968.

Dr. K.A. Mujib is working on marine fish, largely descriptive morphology, but he expressed interest in several aspects of biometrics and efforts to establish and use definitive criteria for the separation of year classes.

Dr. Mohammud Tufail is primarily concerned with crustacean growth, regeneration, and molting. He has recently become involved in studies on larval development of crustaceans, environmental factors associated with survival and rates of development, and techniques which permit the culture of crustaceans under laboratory conditions. Tufail received his PhD at the University of Exeter and worked on several aspects of larval development at the Duke University Marine Laboratory in 1964. Although he would like to continue the studies on larval development of Pakistan crabs, facilities for laboratory culture are not available at the present time.

Within the Zoology Department there are also three assistants who are working on marine problems for the PhD with the staff mentioned above. Mr. Tariq Mustufa, Mr. Mohammad Ahmad Khan, and Mr. Jafer Ali Khan are all concerned with problems of systematics, ecology, or distribution of marine animals.

Tufail, as part of a tour of science facilities in Karachi, took me to the public aquarium which is located not far from the ocean beach. There one large room has been made available to the Department for use as a marine laboratory. It was sparsely furnished with tables and desks, electricity had recently been installed, and three large cement salt-water tanks were located in a smaller adjacent room. Running sea-water was to have been available as part of the general aquarium system, but the tanks had obviously not been used for some time. Tufail, as well as others in the Department, have used the room occasionally for teaching purposes. With a little effort, as well as some basic equipment, it would also be adequate for a number of research workers. The condition of the marine animals in the public aquarium would suggest that the supply of sea-water is adequate and sufficiently unpolluted to permit the maintenance of most marine animals for reasonable lengths of time.

University of Karachi, Department of Physiology

This Department has only recently been formed, having previously been included within the Zoology Department. The only staff member, Dr. Mahmood Hasan Qazi, and his student, Mr. Anwarul Haq Malik, are concerned with developing a program in vertebrate endocrinology, largely with marine fish. Qazi received his PhD from Tulane University, and is

obviously finding it difficult to continue his research without the necessary equipment.

The charter for the University of Karachi was granted in 1952 and development of the new 1200-acre campus began in approximately 1958. It is apparent that considerable effort and money have been expended on the numerous, well-designed buildings (a French architect), and although it still has the stark appearance of any new campus, the efforts at landscaping should become more apparent within the next few years. I was told that in West Pakistan there are approximately 30,000 students in 30 colleges, 3,000 of whom were continuing their education beyond the BSc at the University. Two years are normally required to attain the BSc, and, for those who do continue, one additional year is required for an Honors degree plus a further year for the MSc or two full years beyond the BSc without the Honors program. Within the Department of Zoology four PhD degrees have been given since 1958. The main library of the University presently contains 200,000 volumes and 1,200 journals. It is apparent that Dr. Moid, who also received his library science training in the US, is determined to make it the finest library in that area of the world.

The general attitude of the Government toward university research is exemplified by the fact that from the entire university budget, $3,000 is available for all research in all departments. Research grants from central granting agencies apparently do not exist. Some foreign assistance in the field of marine biology has been available. UNESCO has designated the University of Karachi as an Advanced Center for Marine Biology, and in 1966-67 a grant of $10,000 was to have been made available. This would be used largely, however, to provide two "external fellowships," one for studies on plankton and the other in benthic ecology. This grant, thus, would not improve the research facilities within the University. At one time, approximately five or six years ago, a number of scientists within the University were encouraged to apply for research support from "counterpart" funds and to develop programs agreed upon and of mutual interest to the Governments of the US and Pakistan. Shortly thereafter, international politics resulted in a reversal of policy by the Pakistan Government. One staff member who had received such a grant, not among the individuals mentioned, has developed what appeared to be a very promising line of research, but it was apparent that his colleagues do not appreciate the fact that the reduction in his teaching load and the small luxuries (strictly on a relative basis) which resulted from this financial support are not available to them because of the reversal in their government's policy. It is understood that recently similar efforts have been approved once again by the Pakistan Government, and at the time of my visit there was considerable discussion of research programs which might qualify for support from "counterpart" funds.

Within the Departments of Zoology and Physiology there was little basic equipment for research. One example may serve to place the term "basic" in the perspective in which it should be used in this report. Tufail had collected some ovigerous crabs with the hope of hatching the larvae and maintaining them in the laboratory. An assorted array of chipped glass containers, many of them normally associated with cooking and covered with irregular pieces of slate, were available in sufficient numbers to permit the animals to be changed to fresh seawater if one of the bowls were washed during each transfer. This in itself might not be unusual, but the fact that these same containers would have to suffice to maintain all of the larvae which might eventually hatch would discourage even the most enthusiastic worker. There were no funds to purchase additional household containers and what we would normally consider scientific glassware was not available, even if the funds had been. There was no equipment to maintain temperature, and since the disparity in size of the containers prevented even the use of a running fresh-water bath in the nearby sink, the ovigerous crabs and those few larvae that had managed to hatch were exposed to day temperatures of approximately 100° F and night temperatures of 70° C. It is apparent that those scientists who have received advanced degrees in foreign universities find it extremely difficult to adjust to conditions which face them on their return to the University of Karachi.

Information from a number of different sources within Pakistan would suggest that the paucity of equipment and support for research is quite general. The Pakistan Association for the Advancement of Science in its 1966 Annual Report deplores the general condition and specifically states that the Universities in Pakistan were not able to develop scientific research and advanced training during the 2nd Five-Year Plan to an adequate scale. It called upon the Government to establish a University Grants Commission to develop research in the universities, and noting that the allocation of funds for university education during the 3rd Five-Year Plan was inadequate, recommended that an additional grant of Rs. 20 crores ($40 million) be made available for that period. It further recommended that other grants be made available to the universities to develop their scientific departments.

During my visit the Karachi paper DAWN carried an editorial entitled "Science and Progress." It commented on the areas where science could make significant contributions and referred to the recommendations of a visiting expert (a Soviet professor of agronomy) that Pakistan should not continue to rely on foreign experts, but rather should train their own scientists and place them in positions to respond to the challenges facing the country. It will remain to be seen the extent to which the scientists remain and respond when their advanced education and research experience receive minimal support from the Government.

Zoological Survey Department, West Wharf, Fish Harbour, Karachi

The Director of this group, Mr. Sifatullah Siddiqu, is primarily an ornithologist and was attending a meeting in Lahore at the time of my visit. I did meet, however, the four members of the staff who are involved with marine animals.

Mr. Farooq Ahmad is working on the taxonomy of marine fish in Pakistan waters, largely those which are of commercial importance, however, it was apparent that his interests extended to non-commercial species also.

Mr. Faizyab Ali Zaidi's studies are concentrated largely on the systematics of amphipods, but he expressed some interest in ecology and distribution also.

Mr. Daud Khan was making a study of ship worms. It was not apparent, however, whether the collections were regularly made from a number of different areas or if his interests included seasonal rates of fouling, larval development, and general distribution of this group.

Mr. Khushid Ahmad was quite new in the group and initially was attempting to become familiar with marine invertebrates in general without any specific area of interest.

All of the staff in this Department were extremely young (20-26), and many had apparently had very limited experience and training in the area of marine biology. I had the distinct impression that they were going through a prescribed routine without any real thought as to the purpose of the work or the use to which it might be put. Many of the collections were quite old, perhaps remaining from a period prior to partition, and although the library contained a number of complete series of journals from all over the world, the room gave the appearance of being little used.

Marine Fisheries Department, West Wharf, Fish Harbour, Karachi

The Director of this Department, Mr. Agha Ghulam Husain, was also attending a meeting in Lahore, but Mr. Masood Burney, Deputy Director, explained the program and introduced me to two other staff members who were there.

Burney, interested primarily in fishing-gear technology, was quick to point out that the research in this Department was directly applied to the fishing industry. As evidence of their success he indicated that within the past five years the number of commercial trawlers had increased from 50 to 246, gill netters were being successfully used in small numbers, and the freezing plant and fisheries cooperative had been completed and were in operation. The Department maintains two fisheries research vessels. The M.F.V. MACHHERA is 67 ft in length and was built in 1952 from funds provided through the AID program. The M.F.V. NEW HOPE is 42 ft in length, and according to the report of trawling operations for

the period September 1962 to May 1963 (just published in 1966), both of these vessels have been involved in a number of surveys in the Arabian Sea. Neither appeared to carry any of the specialized equipment normally associated with oceanographic research.

Mr. Qadir Mohiuddin, describing himself as an oceanographer, is apparently responsible for routine water samples which are taken on the survey cruises. However, the data were not available for discussion nor was any reference made as to how this information would eventually be used in connection with the fisheries research program.

Mr. Shamsuddin Qureshi is working on the taxonomy of commercial shrimps in the Arabian Sea. He is also interested in distribution, seasonal fluctuations, and environmental factors which may contribute to annual fluctuations in the shrimp populations available to the fishery.

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13. ABSTRACT

The report considers the staff, facilities, and research interests of the three institutions in West Pakistan which are associated with the marine sciences, the University of Karachi, the Zoological Survey Department, and the Marine Fisheries Department. General aspects of the scientific community and the attitude of the Government to research are also considered.

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